1. In **350 words or less**, please describe the type of company and internship work assignment you would prefer and why?

Since childhood, the study of rocketry has fascinated me and ignited a lifelong passion for learning and innovation. Although a decade has passed since the initial spark that began this interest, time has only narrowed and strengthened my devotion to pursue my vocational goals within commercial space. This dedication is reflected in my academic and professional experiences and pursuits. I stared as an undergraduate researched by joining the Nuclear Particle Group, where I obtained experience in scientific research and team-oriented operations. I then transitioned to an internship at TURBOCAM International where I acquired knowledge relating to the inner workings of a private aerospace engineering company. During all this, I also channel my enthusiasm for spaceflight into the University of New Hampshire’s Students for the Exploration and Development of Space, where I have served as Vice President for the past year alongside a former Matthew Isakowitz Fellow, Charlie Nitschelm.

This industry is as interdisciplinary as the host companies themselves, therefore I see my experience and passion oriented most with those in rocket propulsion, vehicle integration, and spacecraft design. Each host company serves a purpose of progressing human development in space, but host companies such as Virgin Orbit, Rocket Lab, and The Spaceship Company will always climb to the top of my list. As an intern, my focus would be to learn and assist those around me, I would be there to get hands on with engineers and technicians alike.

I have had the pleasure of knowing exactly what I want to do with my life since I was young. If I am granted a spot in the Matthew Isakowitz Fellowship Program, I will bring the love for space I have carried for the past 10 years and will carry for the rest of my life. The work done by NASA in the Space Race encouraged me to take my first steps, I want to be a part of the team that encourages others to take theirs.

1. Please answer **ONE** of the following essay questions in **350 words or less**:
   * What will be the next giant leap in space technology from the private sector and why?
   * You are testifying before Congress for a hearing focused on the biggest barriers for the commercial space industry. What would be your opening remarks?
   * Elon Musk, in a discussion with our 2019 Fellows, stated that starting a company is like “eating glass and staring into the abyss.” Thankfully, you have the stomach for this kind of business. What start-up idea would drive you into starting a business and why?

Thank you chairwomen Kendra Horn and ranking member Brian Babin, thank you for the opportunity to testify today. As we sit here today, there are more than 21,000 objects larger than 10 cm orbiting the Earth, not to mention the 500,000 bits of space debris that fall between 1 and 10 cm. On the bright side, small debris burns up once it re-enters through the atmosphere, and larger objects can be tracked, simulated and ground impacts predicted. Now, predicted, not controlled, not modified, simply predicted. As you can see, space debris poses a threat for the space industry on both fronts, in the sky and on land. Competitive entrepreneurship within the commercial space industry has dramatically lowered launching costs, from $54,500 per kilo on the Space Shuttle to $2,720 on the Falcon 9. With this decrease in price, we will see an increase in the number of items launched into orbit. Thus, it is crucial that we recognize commercial space’s responsibility for these items.

In a recent industry study, I asked 35 professionals what the biggest barriers in the industry were currently, and in the foreseeable future. Of the responses, 65% + mentioned space debris and orbital debris disposal as one of their top issues. These professionals are ingrained in our industry, from a Manager of Business Development at one of the largest defense contractors, to a CEO & System Engineer at a Korean based small orbital launch company. Their input is invaluable and as one professional commented on space debris, “It’s like driving across a vast desert with your eyes closed, maximum car speed, with a lot of other cars driving there too, and being told to turn right, or turn left, and the person giving the direction only seeing a very small fraction of things you can run into.” These dangers exist in every facet of space, from life support systems on the ISS, to precision equipment on revolutionary space satellites. Space debris poses as one of the most formidable dangers, and barriers to the commercial space industry. Thank you, and I look forward to answering your questions.

1. In **800 words or less,** please answer the following: Why are you excited and passionate about commercial space and your current or future role in it, and why are you a strong candidate for this Fellowship?

When I was 11 years old, I watched *When We Left Earth (2008)* with my father, I was completely engrossed by the sheer size, technicality, and power those beautiful machines produced. I marveled at the challenges they overcame, the milestones they stood on and how the astronauts were living legends. It was everything you could ever ask for in a science fiction fantasy, except it wasn’t. I could travel to Pad 39A, walk under rockets at the Kennedy Space Center and meet Buzz Aldrin at the 2019 International Astronautical Congress. Nothing fascinates me more than the fact that I could be a part of this universal journey.

         In August 2015 I started my undergraduate’s degree in Engineering Physics from the University of Maine (UMaine). The University had advertised itself as specializing in engineering while the University of New Hampshire (UNH) emphasized business. After three semesters, that was distinctly not true. The school’s facilities were aging, and I had failed to get actively engaged within the academic community. I compared my development to that of my brother, who was soon graduating from UNH with a fulltime job and multiple internships under his belt. I did not see myself achieving the same while at UMaine and realized I needed a change, transferring to UNH was my solution. Once at UNH, I spent no time lost, joining extracurricular organizations and activities. I found my home with UNH Students for the Exploration and Development of Space (SEDS) just a few weeks after its foundation and reconnected with Charlie Nitschelm, future 2019 Fellow and an old acquaintance from middle school.

         UNH SEDS stems from SEDS, a nationwide organization whose mission is to that empowers young people to participate and make an impact in space exploration. UNH SEDS has allowed me to pursue the commercial space industry all while reinforcing the concepts covered in my engineering courses. Although a select instance, sitting in Classical Mechanics my Professor begins class with “Today we’ll be reviewing Tsiolkovsky’s rocket equation.” The following 50 minutes were the best class I have ever attended, and since then many freshmen have received a premature dose of Classical Mechanics and the famous rocket equation. Instances like these are what I try to foster at UNH SEDS, an environment where regardless of your grade or major, there is something exciting to learn about the world above. It has been my pleasure to be the Vice President for the past three years, working with freshmen to seniors, it has been the most rewarding work I have ever done.

         UNH SEDS’s development was critical to UNH, it previously lacked an engineering competition team that incorporated all degrees and years. UNH SEDS allowed for knowledge transfer between years to be seamless, and to build a relationship between undergraduates and alumni. During the 2017-2018 school year, mastery of rocketry was a far-fetched reality, from lawn darts to lake landings, we failed in the most glorious fashion. Time and time again, we marched out to our home-made launchpad and completed 9 flights. Lessons learned and modifications made we felt strong in our understanding and looked forward. 2018-2019 brought in the development of Runaway, our hybrid engine utilizing HTPB Rubber and Nitrous Oxide. Through four hot-fire tests, we gained insight on our engine’s performance and the capabilities it would be able to achieve the following year. 2019-2020 started with less than 10 months till the Spaceport America Competition, with a group of 14 seniors and 25+ underclassmen, I can’t wait to watch USURPER soar and see the fruition of three years and over 1000 hours of work come together.

           My time with UNH SEDS has been the best memories of my life. I’ll always remember when Charlie and I stayed in the workshop (shop) until 3 AM, finalizing our second rocket, only for it to undergo a rapid unscheduled assembly during flight. It never felt like work. I grew as the organization grew, I loved and cared for our mission and the work we put in each day. In 6 months from now I’ll have to say goodbye to this family, but the accomplishments of this team are my proudest moments. I can only hope that I have opened Space for one of the undergraduates filling in my footsteps.

         Commercial space capitalizes on man’s innate desire to explore. It captures the minds of the youngest generation and the greatest engineering minds alike, inspiring entrepreneurs to drive the market faster and further than the government's reach. When considering its sphere of influence, it’s nearly impossible to determine as commercial space it is ever expanding. Personally, nothing could generate a more fulfilling life’s work than to work with a team of people who are driven by the challenges before them.

In conclusion, I believe I am a strong candidate for this program because I share the same drive for exploration that Matthew Isakowitz exhibited. Matthew was an inspirational figure within the commercial space industry and his curiosity was only matched by his kindness. It would be an honor to be part of his living legacy.